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Alternative Ways of Funding Public Transport

A Case Study Assessment

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Public transport traditionally has been, and still is, heavily subsidised by local or national governments, which have been motivated by declining average cost arguments, social considerations, and the desire to offer an alternative to private car use. Conventional sources for funding, including general taxes on labour, in many occasions have become harder to sustain for various reasons. This paper explores alternative, increasingly implemented, sources of funding, i.e., local charges or taxes that are hypothecated to support (urban) public transport (such as local sales taxes, parking charges etc.). Based on an overview of several case-studies all over the world, it is found that there is a large potential for applying unconventional charging mechanisms. Not only as means of raising financial support for public transport systems, but also as a method of sending appropriate (from a sustainable point of view) pricing signals to transport use.

1. Introduction

Public transport refers to a collective transport system, which is made available, usually against payment, for any person who wishes to use it. Public transportation services can be provided at various scale levels and can take different forms. Common in many cities is the public bus and to a lesser extent the tram. Fewer countries have underground services or rapid rail. At the interurban and regional scale, bus and trains provide public transit services. An important characteristic of these services is that state and local government are normally largely involved in financing and operation, because public transportation is often an unprofitable business activity nowadays.
Over the past years, public transport companies have been supported primarily by federal, state and local funds and revenues from fares. Many agencies have had to cope with the costs associated with broadening policy goals. At the same time, elements of transit provision

continue to demand more financial resources. The labour-intensive nature of the public transit industry, the increasing maintenance needs of the older systems and the suburbanisation of jobs and residences have combined to burden many agencies' cost and revenue structures (TCRP, 1998). This has led to a general apprehension about the growing gap between operating expenses and revenues. This need for additional funding is in clear contrast with the recent trend of reduced government financial support for public services (especially in Europe). It is a clear fact that government sources dedicated to transit (tax revenues) are becoming more and more limited and uncertain. For this reason, authorities (often together with transit operators) are increasingly interested in alternative sources of funding. Innovative funding techniques may include the developing of non-farebox revenue from concessions, adopting private sector methods (e.g. turnkey development), new fare structures, value capture strategies, use of property rights, leasing techniques and hypothecated (local) taxation.

In this paper the term unconventional, hypothecated taxes or charges is used to refer to a wide number of local taxes or charges, some or all of the revenues from which are directly earmarked to support public transport. The general idea is that revenues gained from some kind of charge are dedicated to finance operating or investment costs of public transport. This can take various forms. A well-known example in Europe is the introduction of a dedicated local employment tax (the Versement transport) in 1971 (see also Farrell, 1999). But there are many other, less known, examples which are equally interesting. This paper will deal with these unconventional charging schemes and provide a world-wide overview of practical experiences. In the end an assessment based on several criteria will be carried out to derive some general lessons.

The paper is organised as follows. Section 2 will offer some general notes on the various subsidy forms and points out several arguments to provide subsidy to public transport. In section 3 the various case-studies will be outlined, starting with the employer/employee taxes and ending with some miscellaneous forms of charges. Section 4 will carry on with the assessment of these categories in order to derive some main outcomes and results. Finally, section 5 will present some conclusive remarks.

2. Financial assistance for public transport

2.1 Subsidies

Since virtually all public transport systems operate at a deficit, they are obviously obtaining funds from other sources to balance their books and stay in operation. These funds come from federal or local governments. Money provided to cover these deficits is usually called a subsidy. A subsidy can be defined as a payment that does not require a direct exchange of goods or services of equal market value in return; it is used to accomplish a specific objective or has a specific effect (Black, 1995). It is an example of a transfer payment. A subsidy is not a gift; there are strings attached to the use of it. Various forms of subsidies exist, also in the public transport market.

One form of subsidy is called deficit financing, where a loss (unexpectedly) incurred is written off by the controlling authority. All or part of an accumulated debt may be written

off, either at the end of the year in which it has been incurred, or at a later date, for example, to prepare an undertaking for privatisation. Governments may give money to a transit agency threatened with bankruptcy. Deficit financing is an unsatisfactory form of financial support, because it is open-ended and it provides no incentives to management to control costs.
Related to subsidies are cross-subsidies between different user classes. Cross-subsidies occur when revenues in excess of (variable) costs for one group are used to finance deficits incurred for other groups. Sometimes, the transfer of money was never intended nor anticipated. For instance, nobody planned for off-peak transit riders to subsidise peak-period riders; it just happened because of aversion to changing fares (too much) in the middle of the day. Another well-known example of cross subsidisation (see also Section 3) involves cross utility subsidies, where the profits from other utilities cover expenses of the loss-making public transport.

2.2 Why subsidies

Many public services (such as police) collect no revenues and are therefore technically subsidised because provision is being regarded as necessary. Besides, it can be impractical to put all operations on a fee-for-service basis. Public transport does collect revenues (fares) but it is still often being regarded as a public service and subsidised. Economists have offered some justifications for subsidies to public transport, among which the following are often cited (see also Black, 1995 and Gwilliam, 1999).
First public transport is being marked as a decreasing cost industry. Fixed costs are large, especially for rail systems, and variable costs are relatively small. Public transport companies usually operate at less than capacity (they could carry more riders with little increase in costs); marginal costs for an extra passenger are consequently low. Therefore, if price is set equal to the marginal cost (this is the economic rule in price setting as being the most efficient allocation of resources and maximising social welfare), public transport operators will suffer a loss, because marginal cost is less than average cost. It may be clear that funds must be raised somewhere to keep these operators in business. This financial support is often provided in the form of a subsidy if public transport is deemed to be in the public interest.
The second argument that has often been used refers to an indirect form of positive externalities (economic behaviour of parties that creates benefits to non-paying others) of public transport. This can be seen as a second best consideration: as long as road use is not fairly and efficiently priced, there is an argument for subsidising its substitute. When some people switch from automobile to transit, this reduces air pollution, congestion and noise, which benefits other people who are no transit users. This will generate lower external costs and therefore public transit should be subsidised.
A next argument is often called the ‘equity’ argument. A major argument for subsidising transit is the redistribution of income to certain groups. It transfers real income in the form of transit service rather than cash. Some groups in society, which are largely dependent on this service, will benefit from this subsidy. Among these target groups are the very poor, the disabled and elderly. Critics often point at the effectiveness of this argument as it depends on the extent to which these groups use transit, because subsidies are primarily going to the providers. It may be argued that the intended redistribution could be accomplished in a less distortive way.

So it becomes clear that subsidies in this context of the public transportation market have been justified on various grounds. However, it should be acknowledged that some recent research suggests that even when taking account of second-best considerations, current subsidies are excessive and economic efficiency would be served better by increased rather than increased subsidies (Proost et al., 1999). In this paper we are not so much concerned with the question whether public transport should be subsidised, but rather we will consider the various ways of raising revenues, taking the desire of subsidisation as given. The optimal amount of subsidy is indeed also another question. Several economists have made theoretical derivations of optimal transit fares. Attempts to devise operational pricing rules for urban transport are for example reviewed by Nash (1978), while subsidy policy is discussed by Else (1992). Their recommendations are in general not very practical, it is basically a political decision as to what amount of subsidy is given. There is a wide variation without any standard pattern also depending on local circumstances (e.g. network configuration, operating costs).

Apart from the *amount* of the subsidy, yet another question is exactly *what* should be subsidised. One popular view is that government subsidies for *infrastructure provision* (*e.g.* rail) are defensible on efficiency grounds: a considerable share of the losses with optimal marginal cost pricing may result from the large fixed cost of infrastructure. However, the *operation of the services* may in many circumstances involve constant or even decreasing returns to scale, in which case one of the major economic motivations for subsidies would vanish.[1] Deregulation and privatisation policies may then involve the auctioning of the rights to operate a service to private companies (see Small and Gómez-Ibáñez, 1999).

It is important to emphasise at this point that, in this paper, we are not concerned with the efficiency aspects and more general desirability of subsidisation of public transport *per se*. Rather, we merely aim to review the pros and cons of various unconventional ways of doing so, as they follow from the cases we study. The next section starts with an overview.

3. Funding sources for transit; unconventional charges and taxes

3.1 Introduction

Traditionally, financial support for public transport is financed by general taxation revenues. The authorities (federal or local) collect the revenues from various taxes; individual and corporate taxes are the biggest sources. In these cases, the funds originate from the same mix of revenue sources as for other public services. This means that there is no direct link between the source of revenue and its dedication (no hypothecation). The major problem with these forms of financing for public transport is that there is a great deal of competition for public funds, and public transport often loses out to spending on, for example, education and health. This is problematic because of the need for large sums of money being spent over long periods of time, which in transport tends to be the rule and not the exception. This has

[1] This argument ignores the so-called ‘Mohring effect’, which is the reverse of congestion, and reflects the positive externality that public transport users create for each other through the increased frequency that is (in the long run) associated with increased usage (Mohring, 1972).

led to a search for new sources of funding, which have included the private sector (via privatisation or contracting agreements) and earmarked charges or taxes.
This second category, the unconventional taxes or charges, refers to a wide number of local taxes and charges, some or all of the revenue from which is directly hypothecated to fund public transport. In recent years, the use of earmarked taxes for local transport demand management has attracted growing attention. This is linked with the above mentioned trend of seeking additional funding, and the trend to devolve responsibility for local and regional public transport away from national government in a number of EU states. This has led to the desire to devolve funding mechanisms, too.
It is interesting to see whether these unconventional funding mechanisms can form a reliable source of income for public transport and to which extent they are implemented in practice. After an extensive study it appears that a wide variety of implemented and proposed schemes exist throughout the world. We have identified nine different categories, which we will discuss.

3.2 Employer/employee taxes

While employer and local income taxes are collected by national and local governments world-wide, only in a few cities these are hypothecated to pay for public transport systems. Local payroll taxes are used for public transport both in the United States and in Europe. Portland and Eugene in Oregon are well-known examples in the U.S. The State of Oregon has authorised local transit agencies to use a payroll tax to generate revenue. Louisville and Cincinnati use municipal income taxes to finance public transport subsidies.
In Europe, dedicated employment taxes have been used in France, a well-known example being the Versement. The high level of investment and light rail schemes has been made possible by the introduction of this tax. It was first collected in Paris in 1971, then extended to provincial cities of smaller size (Farrell, 1999). The tax must be paid by all firms with more than nine employees, unless these are housed on the premises or the firm provides its own transport for employees. In a similar way, the Vienna underground has been financed by a local payroll tax.

3.3 Property related taxes

As with the employer tax, part of the logic behind the property tax centres around the concept that by providing a public transport service, the occupants of the properties served benefit (in this case by an increase in the value of the property). Thus, the tax can be seen as a form of recapturing value. This value capture mechanism has been defined by Tsukada and Kuranami (1994) as a mechanism by which the agency responsible for the development of the urban transport infrastructure captures part of the financial benefit gained by land developers or the community at large. This benefit is reflected in an increase in the real property value, which can be regarded as a comprehensive index of all the benefits generated by the development, including improved accessibility and increased business opportunities. This process of ‘value recapturing’ can be divided into taxes and the usually one-off or irregular developer levies (see also section 3.4). The tax can be defined here as properties paying regular and continuous amounts to local or regional government, which then earmarks a specified amount to subsidise public transport.

Paying for the provision of public services through the collection of property (or land) taxes is a fairly common method world-wide, being evident throughout Europe, Asia and North America. However, for the most part the money is collected by authorities and allocated to each sector according to prevailing political objectives. However, earmarked property taxes to fund public transport are common in North America, in cities like Minneapolis, New York, Denver, Detroit, Miami, Los Angeles, San Francisco and Vancouver (Simpson, 1994; Bushell, 1994). Examples of earmarked property taxes outside North America are rare, but can still be found in Japan (e.g. Osaka), India (Mumbai) and Spain (Barcelona).

3.4 Development levies

Value recapturing is not necessarily restricted to property taxes; development levies can also be introduced. Various mechanisms can be placed under this heading. This tends to operate within planning rules, and is consequently often more flexible and individually tailored. Sims and Berry (1999) report that value capture through specific taxes or charges has included:

- Development charges, whereby part of the cost of transport would be recovered by special charges on different land uses, usually levied at the time of new development of properties in the benefiting areas;
- Benefit sharing, which is similar but which is tied specifically to the increase in property values resulting from public investment;
- Density bonusing, in the vicinity of public transport stations whereby participation in a program is voluntary. Developers may choose to participate or not; they receive extra density or extra permissions to build, but they pay for them. A similar type of scheme is tendering or auction of density, where a fixed amount of density is put up for auction;
- Connection charge, whereby a property owner pays a specific fee to be connected directly to the transit system.

Examples of implementation in practice of these kind of schemes can be found all over the world. Quite many are to be found in North America, e.g. the Transport Impact Development Fund in San Francisco, the joint development of Bethesda Station in Washington and density bonusing in Portland. In Europe, a development charge scheme can be found in Hamburg, Germany. Joint development schemes also came into existence in Japan and Hong Kong, where the new railway between the central business district and the new international airport is financed by development levies. Finally, in Montreal (Canada) an underground city around the metro has been created by connection fees.

3.5 Parking charges and fines

Parking charges are a normal fact of life and are used throughout the world by local authorities to fund their activities. As such they cannot be viewed in themselves as an unconventional mechanism. However, such charges are only rarely hypothecated to support public transport or as a part of a planned transport funding package. Clear examples are to be found in England. Revenues of parking charges in Milton Keynes are dedicated to support public transport being part of a transport and parking strategy. This example shows the potential of these charges in linking it closely to environmental and transport planning processes. Another scheme is implemented at the Heathrow, Stansted and Gatwick airports, where passengers contribute an average 25 pence for every parking transaction. The revenues

are credited to a budget that goes towards improving public transport within and around each specific airport. Additional schemes are noticed elsewhere. Revenues from city-centre parking are also used in Amsterdam to partly fund a new tramline. Similar implementations world-wide include Aspen (Colorado), Miami (Florida), La Spezia, Verona and Milan in Italy.

A related source of funding to parking levies is that of parking fines. In France, additional revenues from parking fines and driving offences have been earmarked to pay for public transport infrastructure since 1973. This was enabled by the passing of the same piece of finance legislation that resulted in the Versement in 1971. In the special case of the Ile-de-France region part of the proceeds from motoring fines are used to subsidise public transport (Simpson, 1994). In Athens, Greece, part of the charges imposed on private cars that violate bus lanes will be passed to the local public transport authority.

3.6 Charges for the use of roadspace

The idea of charging for the use of roads is an old one. Already in the late 17th and early 18th centuries many roads in the United States were built as private toll roads. Recently road charging has again attracted interest (especially within the EU). One, more traditional reason, is to generate revenue, particularly for the construction of new roads. A second and more recent reason is to manage traffic congestion and air pollution. But these revenues could also be used to support public transport. Although road (and congestion) charging is not widely implemented, there are some experiences where revenues are transferred to fund public transport.

Urban toll roads in Europe are very much a Scandinavian phenomenon (Farrell, 1999). Tolling in Bergen (first introduced in 1986), Oslo (1990) and Trondheim (1991) are based on a cordon system, in which vehicles (public transport exempted) must pay for entry to the city centre, and the revenues are intended to fund a mixture of road and public transport investments. Tolling is also common in the United States, but often related to use of bridges and tunnels. Some of these toll revenues may be hypothecated to public transport. In San Francisco, Golden Gate bridge tolls are used to subsidise inter-county traffic services, including bus and ferry. Bridge and tunnel tolls are also important funding sources in New York and Philadelphia.

While the former examples were more aimed at raising revenues, there are also schemes initiated at reducing congestion. Congestion charges have had to be paid in Singapore since 1975 (Small and Gómez-Ibáñez, 1998). The collected fees from the Area License Scheme have helped to improve public transport as being a substitute for car traffic. A similar scheme is implemented on a highway (Interstate 15) near San Diego. Here, road users can choose whether to take the congested lanes or pay and use a congestion free lane. This charge depends on the level of congestion on the highway. Revenues are partly used to finance an express bus service in the I-15 corridor.

All previously mentioned schemes have been implemented in practice. However, there are cases where implementation failed, mainly due to a shortage of political support. Public transport would have been supported in Hong Kong (Electronic Road Pricing), Cambridge (congestion metering scheme) and Stockholm (the Dennis package) if the plans had materialised.

3.7 Local motoring taxes

A local motoring tax is a tax levied on motorists by local jurisdictions for local purposes (one of them being public transport) and is collected in addition to state and federal motor fuel taxes. Taxing motor vehicles is common all over the world (mostly nationally levied), but revenues are scarcely directly earmarked (on a local basis) to fund specific objectives. These motoring taxes can take different forms and are relatively common in the United States, especially the fuel tax and excise tax. Here state-enabling legislation is required for local jurisdictions to levy local motor taxes. Restrictions are often imposed on the localities as to the use of the revenues, the rates that may be imposed and the procedure for local approval of the tax. In general, these taxes can provide a significant source of revenue for public transport, depending on travel patterns.

Florida, for example, has two types of local motor fuel taxes, a voted gas tax and a local option fuel tax. The voted gas tax allows a 1 percent per gallon tax to be levied subject to voter approval in a county-wide referendum. The second tax does not require a voter referendum, implementation simply requires a majority vote of a county commission. A local motor vehicle excise tax has been implemented in Washington. This is an annual state excise tax on the 'fair' market value of motor vehicles. Cities and counties are permitted by the State to direct nearly half of the tax revenues for local public transportation needs. In Santa Clara (California) a fuel tax has been used to fund the local contribution to the San Jose light railway (Simpson, 1994).

Other examples outside the United States are scarcely known, although in Canada there are some schemes implemented as well (e.g. Vancouver and Montreal). Public transport in Lisbon (Portugal) benefits from a levy on diesel oil. Finally, in Germany national taxation has existed since 1967 which earmarks about 5 Pfennig/litre tax on sold fuel for investments in urban roads and public transport[2].

3.8 Consumption taxes

In general a consumption tax can be described as a tax imposed on consumption goods such as general merchandise, specific services and luxury items (sales) or utilities (gas, see next section). Consumption taxes can provide a dedicated funding source for a transit agency, and through their implementation, agencies can collect a substantial amount of revenue for operating and capital costs. Transit agencies often use these taxes to replace decreasing federal funding, build significant capital projects, or supplement operating revenue. These kind of taxes seem to be common in the United States where many counties or States have implemented these kind of schemes after obtaining the required voter approval. We distinguish two forms of consumption taxes: the local sales tax and gambling taxes.

A sales tax is the most common locally dedicated revenue source for transit systems in the United States. Sales taxes are applied to goods (e.g. books, clothing) and services (e.g. dry cleaning, house painting) sold in a specific area. In many locations a small tax of one-half percent can generate a substantial portion of the funds needed for the agency's operation. Sales taxes require a strong local retail base to be an effective funding source (TCRP, 1998). While taxes of any sort are unpopular, sales taxes tend to be more acceptable than most other forms of taxation. Sales taxes tend to be regressive and the services they finance do not

[2] We owe this example to an anonymous referee

generally benefit those who pay the taxes. They do provide a stable source of revenue (except during extreme recessions) and respond quickly to changes in overall income levels. A distinction can be made between general and specific sales taxes. Specific sales taxes are applied only onto one particular good such as tobacco (e.g. in Boston) or beer (e.g. Birmingham, Alabama). Cities with a general sales tax (applied to all goods and services in an area) dedicated for transit purpose include Denver, New Orleans, Atlanta, Reno, Fort Worth, Austin and San Francisco (see also Black, 1995). These sales tax schemes are rarely implemented outside the U.S. Some examples can be found in India (Dalvi and Patankar, 1999), while a proposed scheme in Madrid failed and was not implemented.

Gambling taxes are another form of raising funds for public transport. A portion of lottery receipts is then dedicated to public transit. In general, lotteries are seen as a controversial source of revenue. Critics point to the sins of gambling, the opportunities for corruption, and the high rate of participation by the poor. These gambling taxes only seem to exist in the United States; examples are found in Maricopa County (Arizona) and Pennsylvania. As for other proposed tax schemes, the public has to vote before a tax can be implemented. So, significant community outreach has to be completed to raise support for the lottery tax, maybe even more than for a sales tax.

3.9 Cross-utility financing

Cross-utility financing may not strictly be an unconventional mechanism, given its widespread application in parts of Europe, North America and elsewhere. However, it is adopted on a localised basis, and earmarked to fund public transport. Two methods of how cross-utility financing operates in practice are identified. The first is via a levy on utility use, which operates in a similar way as sales and employer taxes, while the second is where a loss-making public transport department is cross-subsidised by a profitable utility department. Revenues partly depend on external factors, such as economic conditions and social trends.

An example of the first type is identified in Pullman, Washington. Transit in Pullman is paid for by a 2% levy on telephone, water and sewer (owned by the City), electric, gas and garbage utilities. The levy is collected by utility companies and transferred to the city of Pullman, which then transfers revenues to the transit department. The levy pays 40% of operating costs of the city's 14-vehicle, fixed route and para-transit service. This tax was also implemented after voter approval. A disadvantage of the scheme is that utility rates determine the revenues, so if utility rates are not raised with inflation, transit revenue stagnates. There is also a 'risk' that successful energy conservation programmes reduce revenue. Other examples are to be found in Springfield, Missouri and New Orleans, where a levy on electric power sales is used to fund public transportation (Cervero, 1983). In Vancouver, a hydro-power levy is used to cover cost building and operating the city's Skytrain system (Simpson, 1990).

The other type, cross subsidy between two utility departments, seems to be more prevalent in Europe. In Germany (e.g. Wuppertal), for example, public transport systems are still often municipal departments, and as such are often subsidised by revenues from other municipal departments, such as water, gas and electricity, that generated a revenue surplus. This effectively allows the municipality to offset any profits against the losses of the transport undertaking, meaning that these profits are not subject to corporation tax. However, in the

long run the liberalisation of the EU will render such models impossible. In spite of this, Farrell (1999) found that around 100 of the 174 public transport companies in Germany that are member of the transport operators association VOV still supply utilities, and as late as the early 1990s around 18% of transport operating costs were covered by profits from these other activities. Similar arrangements are in place in some Italian (e.g. Milan) and Austrian cities, as well as in Luxembourg.

3.10 Other unconventional charges

Two other examples of an earmarked scheme to fund public transportation have been found: a student surcharge and a passenger facility charge. The student surcharge was implemented after voter approval in Berkeley, California. The local operator AC Transit sought an improved universal pass program for students of the University of California that would cost less money and provide more funding for the program. In collaboration with the University the District decided to give a subsidy for the class pass through a surcharge on student registration fees.
In the United States, under a law passed several years ago, airports are allowed to charge passenger facility charges (PFC). The fee is collected by the airlines in the same way as other air-related taxes at the time the ticket is sold. Projects to be funded must be approved in advance of collection of the fee by the Federal Aviation Administration. There are several hundred airports that collect PFC for various projects. While most of these schemes fund airport improvements, a small number also fund the improvement of access to the airports, the most notable of which is the new Airtrain light rail linking JFK airport to New York City.

4. Assessment

The previous section identified a wide variety of schemes where public transport has been financed by an earmarked charge or tax. These case studies were categorised under nine headings. Although each case has its own characteristics and implications, we attempt to make a general assessment of the nine categories identified based on various criteria. The intention is not to give a value judgement. Instead, the aim is more to draw out common themes, lessons and experiences. Herewith it is recognised that emphasis on specific assessment criteria will depend on the case studies; some issues will be more important in some cases than others. The distinguished criteria are:

- the potential and targeting of the revenue raising;
- revenue allocation (to identify winners and losers);
- practicality (in terms of flexibility, enforceability, complexity and transparency);
- transferability
- acceptability (public, political and business);
- link with environmental or transportation policy;
- effectiveness (achieving its initial objectives).

In Table 1 we will only present the main outcomes as it would be too comprehensive to give an overview of the full assessment (see for a full overview: Oscar Faber, 2000).

In general, the fund raising potential of the distinguished cases seems to be high. This is of course predictable, because otherwise a case would be more likely to have been abolished, and otherwise might have been more difficult to find. Still, revenues raised in an unconventional way often form a substantial part of the operating budget or contribute in a significant way to the construction of new infrastructure in the cases studied and relatively large sums are often raised. In order to give an indication of this potential for some selected cases[3], the share of unconventional funds in the total operating budget of public transport companies (or as a percentage of total investment) is presented in Table 1. The rest of the funds usually come from fares and other (conventional) subsidies.

A few cases were corrected for economic distortions (e.g. externalities). Most of the funding sources were developed simply in order to generate income to support public transport. However, examples which do not only raise funds but also affect environmental and transportation objectives seem to gain increasing interest in many countries nowadays.

Table 1. Share of alternative funds in public transport budget or costs

Category	Case	Share in operating budget (annually) or Investment
Employer tax	Versement (France)	Funded on average 33% of the budget of transport companies (e.g. 20% of RATP budget in Paris)
	Portland (U.S.)	Funded 60% of the operating budget of the local transport authority in 1985
Property tax	Vancouver (Canada)	Funded 61% of the operating budget in 1999
	San Francisco (U.S.)	Funded 50% of new infrastructure and 5% of the annual operating expenses
Development levies	San Francisco (U.S.)	Funded in 1996 about 2% of the operating budget of the municipal railway (Muni)
Parking charges	Heathrow (England)	Funded 0,3% of the total expenditures of the airport (including large infrastructure projects)
	Amsterdam (Netherlands)	In total parking revenues will fund about 1% of the total infrastructure costs of the IJtram
Charges for the use of roadspace	San Francisco (U.S.)	Funded 49% of the operating budget of the bus and ferry organisation in 1997
Local motoring taxes	State of Washington (U.S.)	Funded 25% of the operating budget of the local transportation authority in 1986
Consumption taxes	Reno (U.S.)	Funded 66% of the operating budget of the public transport company in 1997
	Fort Worth (U.S.)	Funded 71% of the operating budget of the public transport company in 1996
	Atlanta (U.S.)	Revenues were divided: 50% earmarked to operating budget (53% of the budget of the transport company) and other 50% funded new infrastructure
Cross utility	Pullman (U.S.)	Funded 40% of the operating costs of the local transport company

[3] Note: These are nearly all cases for which quantitative data were available. Three more consumption taxes examples could have been added, but produced figures similar to those shown in Table 1.

The allocation of revenues (where is the money spent on by public transport companies) is unclear for many cases, and it is very hard to judge the change in efficiency of public transport after implementing these new ways of funding. But these charging mechanisms are mostly necessary to keep public transport services at a certain level. Especially in the United States, examples are known where transit would probably disappear without new funding techniques. It is also important to recognise that 'losers' (identified as payers of the charge) may also be recognised as 'winners', as improved public transport can also be beneficial for non-users.

Practicality seems not that problematic in implementing these unconventional mechanisms. Most of the examples rely on existing structures, which keeps costs and complexity relatively low. This finding is somewhat predictable as well, as impractical cases would not survive. Flexibility may be restricted, though, due to the processes required in obtaining (political) approval.

An interesting point is, whether these alternative mechanisms are transferable to be implemented elsewhere. It appears to be not that simple to copy successful examples, even though local circumstances and institutional aspects may often be suitable. One should not forget that certain categories (e.g. local motoring taxes and consumption taxes) are very much a product of conditions and taxation systems prevailing in North America. Existing institutional structures (organising referenda) and tax levels make it possible to implement more easily new taxes to fund public transport. Implementing these mechanisms in Europe for example could be more difficult, due to the lack of such processes and existing structures (e.g. already relatively high taxes on fuel).

Acceptability by the public is often low when a new charge or tax is imposed on them, but improves when the objective (to fund public transport) is explained. Therefore, transparency is a key issue. It helps when the public understands the need for revenue, and when the existing tax structure is regarded as not too onerous. This becomes clear from the American experiences where people can vote on the proposed implementation of the financing mechanism (not to be confused with voting on implementation of the facility, which is quite common in Switzerland, for example). These funding examples can count on political support concerning the mechanism, mainly due to the fact that it saves subsidies from general taxes. However, there are also schemes that are not implemented because of the failure in convincing the public of the need for new or better public transport.

Most of the schemes are implemented just as a funding source because of a shortage of public money available. All have of course an indirect link to environmental issues as public transport is generally regarded as being more environmental friendly compared to travel by car. However, there are important cases that can be linked to environmental policy and transport policy more obviously. A clear example being the road user charging schemes that seeks to reduce congestion by pricing the use of the car. In the end, the schemes can generally be regarded as effective (described as achieving its objectives). Almost all schemes create a significant source of funding, which is very often a fundamental reason for adopting them in the first place.

If we then look at the various categories the following impression arises. Table 2 presents the main outcomes, derived from the assessment of the various identified. It may be clear that most of the innovative funding techniques have the potential to form a significant and relatively stable source of revenue. It should be repeated that the aim is not to identify the best category because each case has its own characteristics and its success depends heavily

on local circumstances (e.g. existing tax structure, institutional and legality, public acceptability). This makes transferability for some schemes rather difficult. For example the local sales taxes may be very useful and widely implemented throughout North America but this does not immediately mean that the system could easily be transferred to Europe and form a reliable source of funding for public transport.

Table 2. Main outcomes of the assessment of unconventional funding categories

Categories	Main outcomes
Employer/employee tax	• A simple, low cost and practical mechanism that can be very effective in providing a reliable and substantial fund • Possibility of companies/public to locate outside public transport accessible areas • Acceptability initially problematic, but where the transport system is seen as problematic, businesses may be keen to help address the problem
Property taxes	• A simple, low cost and practical mechanism that can be very effective in providing a reliable and substantial fund • Beneficiary pays • Subject to voter approval in North America
Development levies	• A transferable scheme with varying practicality over the various identified cases • Usually small scale implementation but high acceptability
Parking charges and fines	• A simple, low cost and practical (transparent) mechanism providing a substantial fund • Acceptable and transferable system • Linked to both transport and environmental policy
Charges for the use of roadspace	• A flexible and transparent system with a large potential to support public transport • Acceptability is problematic • Linked to both transport and environmental policy
Local motoring taxes	• A large source of revenue, depending on travel patterns • Transferability depends on existing tax structure • Acceptable as fuel taxes are common practice; voter approval required in North America • Linked to both transport and environmental policy
Consumption taxes	• Transferability might be difficult as these schemes are depending on North American circumstances • Tend to be acceptable as voting is necessary, but significant community outreach has to be completed • Significant source of revenue although influenced by external factors
Cross-utility financing	• A dedicated source of funding with low costs • Not really practical to transfer to EU countries due to new legislation
Student surcharge and Airport fee	• A simple system to collect and easy to understand • Efficient as it provides a specific service which might not have run otherwise • Might be problematic to transfer due to local specific circumstances

Of course the potential to be implemented world-wide differs among the schemes. The increased awareness of the negative external effects of car transport and the general idea of promoting public transport as good substitute, however, seems to be in favour of schemes that charge the car. Charging the use of roads is increasingly viewed as an interesting way of

raising money for public transport and at the same time pricing the externalities of the car. This holds also to a lesser extent for the parking charges and local fuel taxes. So the potential for these cases seem to be somewhat higher in especially the highly congested (urban) areas.
The previously mentioned link towards transport and environmental policy principles of unconventional funding mechanisms is interesting to discuss in some more detail. There are funding techniques that do not involve a positive environmental impact. These have been developed simply in order to generate income to support public transport. Consequently, their relationship to the concept of fair and efficient pricing is ad hoc and unintentional. Examples of this are the employer taxation, local consumption taxes, cross utility subsidies and planning gain. Some 'unconventionals' are an application of the beneficiary pays principle (simply said: the one who benefits from a service has to pay for this). This is the case of the French Versement local employer tax. The rate is higher in city centres where the benefit of public transport is highest and lower in the suburbs to reflect a lower standard of public transport. No Versement is charged outside the city. The same principle holds also for the property taxes. It is important to note that this beneficiary pays principle may stand in direct contradiction to the more recent principle of 'polluter pays' that is behind the EU concept of fair and efficient pricing. This concept states that a price has to be paid for transport use including all costs caused. Costs are seldom imputed at the point of use and the prices paid for a journey rarely reflect the true costs of that journey (EC, 1995). Some costs – related to environmental problems, accidents and congestion – are only covered partly or not all. Several opportunities exist to bring these costs into the price paid for the use of transport. Congestion charging is one of the possibilities to incorporate the costs of congestion. Also parking charges and the motoring taxes offer possibilities to enhance this fair and efficient pricing principle and include the external costs of transport use into the price.

5. Concluding remarks

Although the public transport industry is increasingly being encouraged to improve its cost effectiveness, both by reducing production costs and by increasing revenues, in most countries it is not expected to become wholly self-financing, even when the industry is largely in private hands. External financial support continues to be received from a variety of sources mainly provided by central and local governments. General taxation can be seen as the main source of revenue used throughout the world. This picture is changing however. Authorities are to a growing extent looking for alternative sources of funding local public transportation. Private finance to reduce public sector borrowing and to transfer risk elsewhere is one of them. Another source, elaborated in this paper, involves earmarked charging. Earmarked charges are distinct from general revenues, which can be spent on any legitimate purpose as decided in the annual budget. It appeared that various cases exist where charges or taxes are hypothecated to fund public transport. Most of the nine identified categories provide a relatively stable, dedicated funding source with a high level of practicality. For many of the schemes identified, this unconventional funding forms a substantial share of the operating budget. From the overview it also becomes clear that earmarked taxes are widely implemented in the United States, far the most examples are to be found there. In Europe, relatively few examples have been found. This is mainly due to the institutional organisation in the various countries and the local character of the cases.

Local authorities, responsible for the provision of public transport, have a stronger incentive or need to seek for new ways of financing public transport. Central governments have more possibilities to make use of existing sources (mainly general taxation, as is the case in Europe) and seem to have less need for new funding techniques.
In general, unconventional mechanisms have evolved because 'traditional ways' of funding public transport have been withdrawn or are viewed as politically problematic. Governments have become sensitive to the levels of general taxation, and funding for public transport is particularly vulnerable to this attitude. This is because consistent expenditure is needed over a period of time and, importantly, the results of such spending are not usually apparent within the lifetime of a single government.
There are lessons which can be derived from the previous that should be appreciated for the design of future unconventional mechanisms:

- Using unconventional mechanisms to fund a popular and specific project is likely to increase acceptance, transparency is a key issue;
- The schemes need to be as simple as possible. Complexity tends to increase costs and reduce transparency;
- It may be necessary to reduce other taxes to compensate the biggest losers from the introduction. A reduction in fuel duty compensated by more targeted unconventional mechanisms or a cut in other employee taxes might be examples;
- There is a value in phased introduction of unconventional charges, with the flexibility to fine tune and adopt the mechanisms over time. It is presently impossible to model the impacts and success of demand management transport policy measures. Flexibility in mechanisms thus plays a key-role.

We can conclude that a wide variety of schemes is available to fund public transport via hypothecated charging. Most of them can be very effective in providing a stable and substantial source of revenue. These schemes are not only interesting as means of raising financial support for public transport systems but also as a method of sending appropriate pricing signals to transport use (with the possibility to be integrated with more traditional general fiscal and regulatory instruments). At the level of the individual unconventional charging and taxation mechanism, it is possible to identify some that relate well to the principles of 'fair and efficient pricing' in that they involve at least some element of charging transport polluters. However, the majority of existing unconventional measures have evolved without reference to guiding principles of public finance. Most have been developed simply in order to generate funds to support public transport.
Major drawbacks preventing a widespread implementation are in the field of acceptability and transferability. Public (and thus also political) acceptability is difficult to obtain for a proposal to implement a charge or tax. The United States examples show that the tax should be sold to the community. To successfully pass a dedicated local tax for transit, the community outreach must directly tie the benefits of the transit system to the lives of the individuals in the community. The public must be made aware of the necessity of the tax and see the possible benefits of the scheme. On a local scale referenda may be used to let the population decide whether implementation is justified based on voter approval. When these hurdles have been overcome, unconventional mechanisms could become conventional and may form an interesting option for funding public transport world-wide.

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